Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:

Petitions to:	)	
Establish Microstation Radio	)	RM-9208
Broadcasting Service,	)	
Creation of Low Power FM	)	RM-9242
(LPFM) Broadcast Service	)	
and,	)	
Establish Event Broadcasting	)	RM-9246
Stations	)	

Reply Comments of Edward A. Schober, PE

1. Edward A. Schober, PE is a practicing consulting engineer, licensed in the State of New Jersey and the Commonwealth of Pennsylvania, specializing in radio broadcast facility design and Federal Communications Commission matters. He was a commenter in the original FCC proceeding in the 1960's to discontinue issuing new Noncommercial Educational class D FM authorizations. He strongly opposed the discontinuance. He is a member of the Association of Federal Communications Consulting Engineers and a member of the Board of Directors of the New Jersey Broadcasters Association, however these are his personal comments, and do not reflect the views of these associations.

2. Mr. Schober is in general agreement with the petitioners position that the FCC must compensate for the substantial

decrease in diversity of control of broadcast media which has occurred due to the deregulation of broadcast ownership, and the change of control of virtually all broadcast media to publicly held corporations. Since the valuation of broadcast facilities has moved to such astronomical levels, return on investment (the primary measure of success for public corporations) has driven out many interesting formats and squelched all but the profitable voices. This is evidenced by the loss of Classical Music formats in most major markets. (The exception is where Noncommercial Educational stations fill the void)

3. The Commission has a responsibility to assure that first amendment expression is permitted in the broadcast media. Unfortunately, the broadcast spectrum is a finite resource, and cannot easily support additional full service stations (nor is that necessarily a good idea from a public policy viewpoint, as was experienced in the repercussions of FCC MM Docket 80-90). Mr. Schober agrees with the proponents in RM-9242 and RM-9208 that ownership deregulation has precipitously decreased the accessability of radio broadcast media to the average citizen.

4. The use of radio at events to aid in promoting, directing and informing those attending public events is a valuable

adjunct to radio broadcasting. The example of the success of Traveler's Information Stations at public monuments and events run by governmental agencies proves that this is a valuable service. The Federal Communications Commission should provide for limited area aural broadcast facilities at tourist attractions and temporary public events. These facilities will enhance the convenience, enjoyment and safety of those attending these attractions.

5. In reviewing each of the proposals, Mr. Schober sees a considerable danger in interference to existing broadcast stations and a considerable likelihood that the proposals will not meet the needs that the proponents are seeking.

6. The channel proposal in RM-9208 assumes that one channel will be set aside for "microstations" on the AM and FM bands. Where will the incumbent licensees be moved to, or will "microstations" be permitted only in the few locations where they will not cause interference to existing stations? Clearly, this allocation scheme has not been well thought out.

7. The channel proposal in RM-9242 similarly has serious flaws. In proposing to delete second and third adjacent FM protection from "LPFM" stations it relies on comments made

in proceedings to determine what should be done for grandfathered stations. These stations were in many cases substantially short spaced, and decreasing the spacing further had the potential of decreasing the net interference by making each of the stations better able to overcome that interference by having stronger signals. The proponent misreads contour overlap as being interference. When a transmitter site is already within the service area of another second or third adjacent channel station , then moving them closer together will often decrease interference, but not eliminate it.

8. The proponents in RM-9242 do strike upon several possible areas to make available channels for "LPFM" stations. The first is that it has been my experience in extensive experiments at WIOI-FM-1, an 8 kW FM Booster at Jacksonville, FL which was co-located with 100 kW WJCT-FM at Jacksoville, FL. The WIOI-FM-1 operated on 101.5 MHz while WJCT-FM operates on 89.9 MHz, a spacing of 10.6 MHz. After extensive tests with dozens of different receivers at varying locations - from the base of the tower to several miles away there was NO evidence of ANY interference caused to any service grade signal by the operation of WIOI-FM-1. For each case, where a station serving the area near the

tower could not be properly received on a radio, the WIOI-FM-1 was shut off and the reception compared. In no case was there ANY interference which could be traced to the IF Spacing of WIOI-FM-1 and WJCT-FM. In another case, WMMR Philadelphia, PA and WPHI, Jenkentown, PA operate on frequencies spaced 10.6 MHz apart, and substantially short spaced. According to the former chief engineer of WMMR, there has never been a complaint or experience of IF related interference from this combination. Although Mr. Schober does not have access to the records of the FCC Field Engineering Branch, he believes that there have been no complaints of IF related interference in the past twenty years, in spite of the fact that there are dozens of stations which are grandfathered with short IF spacings. The reason for this is that early receiver designs used mixer stages as the input for FM receivers. Mixer input stages are very sensitive to IF spaced strong signals. When the FCC mandated receiver emission limitations as part of its equipment authorization proceedings, this type of design could not meet the standards. As a result, receivers that are susceptible to this type of interference have not been manufactured for many years.

9. While Mr. Schober does not agree with assertions in RM-9242

that second adjacent channel FM protection is not required for low power stations, he does agree with the argument that third adjacent spaced low power stations cannot cause interference to the service area of a full service station. Second adjacent channel "Interference" experienced by cheap portable analog receivers is related to operation of the Automatic Frequency Control (AFC) circuitry. When the radio is tuned across a very strong signal towards a weak signal, the AFC will remain locked to the strong signal while tuning toward the weak signal. When the AFC unlocks, then the tuning of the radio jumps right over the weak signal, as though it was not even there. If the radio is tuned from the other direction in frequency, then the radio tunes normally. There can be other effects such as desensitization of the receiver front end when one signal is extremely strong thereby making the receiver insensitive to the other weak signal. When two stations are sited near each other and of approximately equal power and antenna height, then there is an assurance that no mutual interference can occur on third adjacent channels, or based upon European experience, probably not even on second adjacent (US Spacing) channels. When you consider low power operations, there is no potential for interference to full service channels with co-sited low power stations on second

or third adjacent channels. There could be a substantial amount of received interference to the low power station from the high power station, however. If the low power station is located at a distance from the high power station, then the low power station has the potential for causing second adjacent channel interference to the high power station over a small area near the transmitter of the low power station. In conclusion: Third adjacent low power stations may share the service area of full service stations without interference if they are co-located or spaced so that the service area of the low power station does not overlap a small area around the transmitter of the full service station. Second adjacent low power stations can be co-located with full service stations. Very low power second adjacent channel stations (1 Watt or less) have no potential for interference to full service stations.

10. The petitioners in RM-9208 imply that extremely low power stations can be financially successful as commercial enterprises. The petitioners in RM-9242 make the same assumption, except that their proposal extends to stations comparable with the present Class A FM facilities. Although there is no question that Class A facilities can be financially successful, Mr. Schober strongly questions

whether stations which only serve an area of a few square kilometers can be financially viable commercial entities. Stations with very small service areas can serve as effective "spoilers" of a radio marketplace by dividing the listenership of the full service stations, and confusing the advertisers who may not be able to discriminate between the full service stations and some "microstation" which happens to come in on the radio in that advertiser's establishment.

11. Tiny radio stations which are non-commercial educational, political, religious, youth service, student operated, special interest, specialty music or arts, community organization based, or serving any of a plethora of other local or special interests are justifiable and viable. They are not dependent on revenues of advertisement, but are dependent upon meeting the societal needs for expression, and protected and fostered under the First Amendment to the Constitution. Mr. Schober believes that this is the need to be met by any extension of the present rules. Mr. Schober can see no legitimate justification for commercial advertiser supported operation of non-full service stations, save one: Dedicated programming to a specific minority community where it can be demonstrated that no commercial full service station provides such service.

12. Mr. Schober believes that in lieu of establishing a new service, that the present FM Translator service can be extended to meet part of this need. If the permissible service rules are changed to authorize local origination of non-commercial programming, somewhat in the model of LPTV, then a demand based system of allocations can be accommodated. If the technical standards are modified to eliminate IF spacing requirements and third adjacent channel requirements, and base second adjacent channel protection on interference calculation instead of overlap (with a protection ratio of 40 db instead of 20 db similar to that in the full service commercial rules) then there will be substantial opportunity for development of this service, except in the major markets, where existing translators could be converted to local origination.

13. A further action which will expand the opportunity for expression with small stations is to expand the availability of Non-Commercial Educational stations. Technically realistic modifications to the Non-Commercial Educational FM station technical standards to eliminate IF spacing requirements for Class A stations, eliminate third adjacent channel protection requirements for class A stations (IE. Class A stations do not cause third adjacent channel

interference, although they should be protected from third adjacent channel interference), and adjust the second adjacent protection ratio for all stations to 40 db from 20 db, to correspond with that used to develop the commercial FM Rules. A footnote to the tables of section 73.207 and 73.215 of the Rules should also delete third adjacent spacing and IF spacing to Class A noncommercial educational stations.

14. Low power stations in the reserved FM band are more able to coexist with TV Channel 6 stations, which can receive substantial interference from high power stations in the lower part of the reserved band.

15. The AM broadcast band is highly crowded in metropolitan areas. It may be difficult to find channels to support low powered AM radio stations in these areas which will not cause interference to full service stations, but the potential exists. The AM band supports two different modes of signal propagation - groundwave during all hours and skywave at night. Low power stations have no potential for providing service by skywave, but do have a substantial potential for causing interference to other stations by skywave. Any addition of signals at night increases the noise floor of the channel, and should be avoided.

Additionally, electrically small antennas likely to be used by low power stations may transmit greater amounts of energy above the horizon than at the horizon, providing a likelihood of enhancing the interference potential of the microstation. Therefore, Mr Schober recommends that any authorization for medium wave low power stations be limited to daytime hours only.

16. There is presently a substantial effort underway to develop a in-band on channel (IBOC) and in-band adjacent channel (IBAC) digital broadcasting systems. These systems all assume that there is some geographical distance between the first adjacent channel service areas of stations. Any microstation development should be carefully implemented so as not to inhibit the deployment of in-band digital broadcasting.

17. If microstations were authorized as digital broadcasting stations, not broadcasting an analog signal, but compatible with the IBOC or IBAC receivers, then the transition to digital radio broadcasting would be encouraged, since the route to access to these alternative voices would be through a new receiver. Mr. Schober recommends that the Federal Communications Commission authorize microstations as digital stations compatible with IBOC or IBAC standards as

developed.

18. These digital microstations would operate with extremely low power, with negligible potential for interference to analog or other digital stations. Using digital only technology, almost anyone who wanted a six block "radio soapbox" could have one in CD quality stereo or quadraphonic. The disadvantage is that the signal requires a substantial digital processing capability to transmit, and the transmitters may be costly, unless they were mass produced.

19. Petitioners have requested that equipment for "microstations" not be subject to equipment authorization requirements. The potential for interference is substantial if poorly designed equipment is placed into service. There is no reasonable cost justification for eliminating equipment authorization requirements.

20. Aside from the technical issues in the development of a low power radio broadcasting service, it is essential to discuss the public interest considerations - what does America need to assure that all its needs can be served by the available mobile aural radio services? The present system does not accommodate the needs other than mass market interests. Specialty interests, whether they be classical music,

foreign language, community interest, tourist development, alternative political views or lifestyles, local religious radio, educational radio, youth development or other narrow areas are given short shrift in the present environment because they cannot generate adequate revenue to support full a full service station. Low power radio may provide the outlet for expression of these vital issues.

21. It is essential, as the commenters have noted that the low power station licenses be widely held, and not concentrated in the hands of a few entities. In order to foster this several proposals have been made which may not be very practical. Mr. Schober believes that restricting ownership of low power stations to natural persons, to governmental agencies and educational institutions within the scope of their charter or jurisdiction, to community associations within their communities, to arts associations, to political parties and clubs and to nonprofit tax exempt organizations will assure that this service provides the opportunities for expression that are presently lacking. Since the nature of "microstation" broadcasting is local in nature, an assurance of local presence of the entity holding the license should be required. Local telephone and physical presence of studios within the service area of the "microstation" should

be required.

22. The licensing of a low power station inherently precludes the use of the channel in that area for another station. In metropolitan areas there will not be enough frequencies available to meet the demands for stations. The antenna, transmitter and other items needed to establish broadcasting are modest, it is reasonable to require that a licensee begin broadcasting quickly. Mr. Schober believes that a low power authorization which has not been placed in operation within 6 months should automatically be canceled and made available to other applicants. Similarly, a station that has been off the air for six months should have its authorization cancelled. A minimum operating schedule should be required of low power stations. To meet some licensee's needs, it may not be necessary to operate with a full schedule. (ex. A theme park which only operates from Memorial Day to Labor day). Any licensee that does not plan to operate with a full schedule should only be authorized for the planned schedule, and other licensees can be authorized the unused hours. Licensees should be otherwise responsible for a full operating schedule according to the rules for a full service station.

23. In summary, Mr. Schober agrees that many of the basic

motivations behind the LPFM and "Microradio" proposals are valid, and that the Federal Communications Commission has a responsibility to act to correct the restriction in freedom of speech which deregulation of ownership of broadcast stations has caused. He sees however that the technical proposals are critically flawed, and will neither meet the need nor protect the existing broadcaster from interference if implemented as proposed. Using the present FM translator and Non-Commercial Educational FM Broadcast rules as a starting point, with minor, technically appropriate modifications can provide much of what the petitioners seek, without establishing a new bureaucracy.

Respectfully submitted,

Edward A. Schober, PE

June 18, 1998